

Application Serial No.: 09/627,522

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Title: Alloy For Battery Grids

Present Application Serial No.: 09/627,522

Present Application Filing Date: July 28, 2000

Prior Application Serial No.: 09/337,830  
(subsequently matured into U.S. Patent No. 6,117,594)

Prior Application Filing Date: June 22, 1999  
(continuation of application filed June 26, 1998)

Examiner: Tracy Dove

Art Unit: 1745

Attorney Docket No.: 47003-108 (formerly 510553.90940)

Assistant Commissioner for Patents  
Washington, D.C. 20231

<b>CERTIFICATE OF MAILING</b> I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as First Class Mail in an envelope addressed to: Commissioner for Patents, Washington, D.C. 20231, on the date below.  <u>Christopher Turoski</u> (Printed Name)  <u>Christopher Turoski</u> (Signature)  <u>7-27-2001</u> (Date of Deposit)
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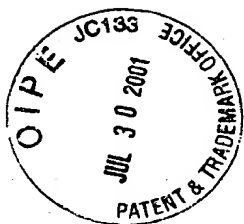
**SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT**

Pursuant to 37 C.F.R. §§ 1.97-98 and in accordance with the duty of disclosure under 37 C.F.R. § 1.56 the Applicants submit herewith the references listed on the attached Form PTO-1449 to the Examiner such that they may be considered and made of record in the above-identified application. A copy of each reference is enclosed.

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### PROPRIETARY INFORMATION

Applicants submit herewith the following documents as proprietary information for consideration under M.P.E.P. § 724:

1. United States Patent Application Serial No. 09/696,109; and
2. Grid cracking study bearing a designation of "5.6.01".

### CONCISE STATEMENT OF RELEVANCE

1. DE 3045683 – an abstract in the English language as follows:

Abstract (Basic): DE 3045683 A

The accumulators require no maintenance, and will accept a deep charge in a very large number of charge/discharge cycles. The grids used in the accumulators contain by wt. 0.01-0.1% Ca, 0.01-0.2% Bi, 0.001-0.05% Ag, the remainder being lead.

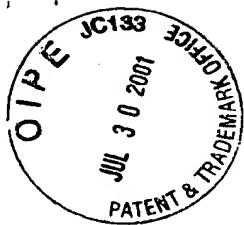
The pref. alloy also contains max. 1.5% tin, and/or 50-500 g of aluminium per tonne. The alloy produces grids with good mechanical-, electrical-, and electrochemical-properties.

The alloy can be made from scrap lead so it is not necessary to use high purity prim. lead. The Al addn. minimises the loss of Ca from the alloy and improves its scratch resistance.

2. EP 0 959 509 – an abstract in the English language as follows:

Abstract

Electrode grids for lead storage batteries comprise a lead alloy which, in addition to calcium and tin and, if appropriate, silver, contains aluminum, the aluminum content being in the range of approximately 0.012% to 0.02% by weight, and the average grain diameter in the web and frame area of the grids is 200  $\mu\text{m}$ -600  $\mu\text{m}$ . Preferably, the aluminum content is in the range of approximately 0.014% to 0.02%, the calcium content is approximately between 0.04 and 0.06%, the tin content is approximately between 0.5 to 1.0%, and optionally 0.5 to 0.7%, and the silver content is approximately between 0.005 and 0.06%.



3. JP 54 058624 – an abstract in the English language as follows:

Abstract

The grid plate is made from a Pb alloy contg. Ca 0.05 – 0.1%, Sn 0.1 – 1.0% and Al 0.01 – 0.04%. The grid plate for automobile battery made from conventional Pb-Ca-Sn alloy has tensile strength  $> 400 \text{ Kg/cm}^2$  after ageing for  $> 400$  hrs. This grid plate must be exposed to atmospheric air for  $> = 400$  hrs. before subjecting to next surface treatment.

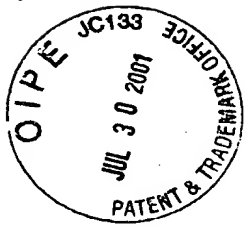
The new Pb-Ca-Sn-Al alloy has tensile strength  $> 400 \text{ Kg/cm}^2$  immediately after casting due to the rapid age hardening property. Thus, the surface treatment of the grid plate can be made successively to the casting. Ca and Sn in the alloy improve corrosion resistance:

4. JP 60 220561 – an abstract in the English language as follows:

Abstract

**PURPOSE:** To provide a lead-based alloy with sufficient mechanical strength suitable for a maintenance-free battery by molding the lead-based alloy taking, as a chief ingredient, Pb added with a little of at least Ca and Sn into a desired shape at temperature higher than a specified one, and thereafter subjecting it to an age hardening treatment.

**CONSTITUTION:** A lead-based alloy having Pb, as a main component, added with a little quantity of at least Ca and Sn is formed into a desired form at temperature over  $50 \text{ deg.C}$ , and thereafter subjected to an age hardening treatment. For a composition of respective components of said lead-based alloy, for example, Ca is made to range 0.02-0.15%, Sn 0.2-4.0%, and Pb the remaining fraction. Or, 0.03-1.5% Ag, 0.03-1.5% Cu, and 0.005-1.0% Al are preferably added singly or as a mixture of two kinds thereof or more. In addition, said age hardening treatment is preferably effected at temperature ranging about  $50\text{-}170 \text{ deg.C}$ .



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Respectfully submitted,

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